IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	Atty. Docket
JOHAN P.M.G. LINNARTZ	PHNL 021217
Serial No.: 10/537,598	Group Art Unit: 2611
Filed: June 6, 2005	Examiner: N. Bolourchi
	Confirmation No.: 5023

DIVERSITY RECEIVER HAVING CROSS COUPLED CHANNEL PARAMETER ESTIMATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF

TABLE OF CONTENTS

(i) Real Party in Interest

The real party in interest in this application is KONINKLIJKE PHILIPS ELECTRONICS N.V. by virtue of an assignment from the inventors recorded on June 6, 2005, at Reel 017243, Frame 0849.

(ii) Related Appeals and Interferences

There are no other appeals and/or interferences related to this application.

(iii) Status of Claims

Claims 1-8 and 10 stand finally rejected by the Examiner, claim 9 having been cancelled. Appellant hereby appeals the final rejection of claims 1-8 and 10.

(iv) Status of Amendments

There was one Response filed on August 24, 2009, after final rejection of the claims on July 8, 2009, this Response having been considered by the Examiner.

(v) Summary Of Claimed Subject Matter

The subject invention relates to a diversity receiver capable of reducing the effects of multipath distortion and is capable of attaining a stable reception of received radio channels in a spread spectrum communication environment.

As claimed in claim 1, the subject invention includes: "A diversity receiver comprising:
multiple antenna receiving branches ***(Fig. 1: B1, B2; Specification page 3, lines 17-19)***, each of said multiple antenna receiving branches comprising estimating means for estimating at least a receiving channel parameter ***(Fig. 1: 6, 7; Specification page 3, lines 24-27)***, wherein a first estimating means in one branch of the multiple antenna receiving branches ***(Fig. 1: B1, 6)*** is operatively connected to a second estimating means in a further branch of the multiple antenna receiving branches ***(Fig. 1: B2, 7; Specification page 4, lines 19-20)*** for using at least a part of the channel parameter estimate in the one branch as an aid for estimating at least a receiving channel parameter in the further branch ***(Specification page 3, lines 19-33)***."

As claimed in claim 2, the subject invention includes the limitation "wherein the channel parameter estimate in the one branch is used as a starting point for the channel parameter estimate in the further branch ***(Specification page 4, lines 27-30)***."

As claimed in claim 3, the subject invention includes the limitation "wherein the channel parameter estimate in the one branch provides a coarse channel parameter estimate, and wherein said coarse channel parameter estimate is used as a start for the channel parameter estimate in the further branch ***(Specification page 4, lines 30-33)***."

As claimed in claim 4, the subject invention includes the limitation "wherein the second estimating means in the further branch is operatively connected to the first estimating means in said one branch for using at least a part of the channel parameter estimate in the further branch as an aid for estimating the receiving parameter channel in said one branch ***(Specification page 4, lines 27-30)***."

As claimed in claim 6, the subject invention includes the limitation "wherein the diversity receiver is arranged for estimating a time delay between the appearance of a certain channel parameter estimate in the various branches ***(Fig. 2: d/v; Specification page 5, lines 6-13)***."

The subject invention further relates to a method for receiving a signal. In particular, as claimed in claim 8, the subject invention includes:

"A method for receiving a signal comprising the acts of:

receiving the signal through multiple antenna receiving branches ***(Fig. 1: B1, B2; Specification page 3, lines 17-19)***;

in each branch, estimating, using estimating means, parameters about a received channel to form channel estimation results ***(Fig. 1: 6, 7; Specification page 3, lines 24-27)***;

exchanging the channel estimation results between a first branch of the multiple antenna receiving branches and a second branch of the multiple antenna receiving branches ***(Fig. 1: B1, B2, 6, 7)***; and

using first channel estimation results about a first received channel from the first branch in the estimating means in the second branch as an aid for estimating parameters about a second received channel in the second branch and forming second channel estimation results ***(Specification page 4, lines 19-21)***."

As claimed in claim 10, the method of the subject invention further includes:

"estimating a delay value between a first channel parameter in the first branch and the first channel parameter in the second branch ***(Fig. 2: d/v; Specification page 5, lines 9-11)***; and

synchronizing estimation in the branches by using the delay value ***(Specification page 5, lines 11-13)***."

(vi) Grounds of Rejection to be Reviewed on Appeal

A. Whether the invention, as claimed in claims 1-8 and 10, is anticipated, under 35 U.S.C. 102(b), by U.S. Patent 5,787,131 to Bottomley.

(vii) Arguments

A. Whether Claims 1-8 and 10 Are Anticipated By Bottomley

35 U.S.C. 102(b) states:

"A person shall be entitled to a patent unless -

***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

*****"

The Bottomley patent discloses a method and apparatus for mitigation of self interference using array processing, which includes multiple antenna receiving branches, and each branch having estimating means.

As noted in MPEP §2131, it is well-founded that "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California,* 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Further, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

1. Claims 1, 8

Claim 1 includes the limitations "each of said multiple antenna receiving branches comprising estimating means for estimating at least a receiving channel parameter" and "a first estimating means in one branch of the multiple antenna receiving branches is operatively connected to a second estimating means in a further branch of the multiple antenna receiving branches for using at least a part of the channel parameter estimate in the one branch as an aid for estimating at least a receiving channel parameter in the further branch" (a similar limitation appears in independent claim 8).

The Examiner has indicated that Bottomley teaches this limitation:

> "wherein a first estimating means (204, 306 and 302 connected to $r_a(n)$ in Fig. 3) in one branch of the multiple antenna receiving branches ($r_a(n)$ in Fig. 3) is operatively connected to a second estimating means (204, 306 and 302 connected to $r_b(n)$ in Fig. 3) in a further branch of the multiple antenna receiving braches $r_b(n)$ in Fig. 3) for using at least a part of the channel parameter estimate in the one branch as an aid for estimating at least a receiving channel parameter in the further branch (302 from estimating means of $r_a(n)$ branch is connected to 306 from channel estimating means of $r_b(n)$ in Fig. 3; furthermore, 302 from estimating means of $r_b(n)$ branch is connected to 306 from channel estimating means of $r_a(n)$ in Fig. 3)".

Appellant submits that the Examiner is mistaken. Appellant notes that Bottomley clearly shows separate channel estimators 302 for each of the branches $r_a(n)$ and $r_b(n)$. While Bottomley shows the outputs from these two channel estimators being co-processed in an impairment correlation processor 306 and a weight processor 204 for

providing weights for respective half complex multipliers (HCM) 208, the two channel estimators operate independently from each other. Hence, Appellant submits that there is no disclosure or suggestion of the estimating means in the further branch using at least a part of the channel parameter estimate in the one branch as an aid for estimating at least a receiving channel parameter in the further branch.

The Examiner now states:

"Applicant fails to notice that his claimed "a first estimating means" is equivalent to three components of Fig. 3, i.e., 204, 306 and 302, which are connected to $r_a(n)$; and his claimed "a second estimating means" is equivalent to three components of Fig. 3, i.e., 204, 306 and 302, which are connected to $r_b(n)$, as shown below (emphasis added)"

(See Appendix 1)

"Therefore, as noted and admitted by the Applicant discussed above, the first and second estimating means have 204 in common (i.e., "operatively connected"), which 204 receives one channel tap from each antenna, as underlined in the extract above (i.e., "using at least a part of the channel estimation in the one branch as an aid for ... in the further branch")."

Appellant submits that the Examiner is overlooking an earlier portion of claim 1 which states "each of said multiple antenna receiving branches comprising estimating means for estimating at least a receiving channel parameter". Hence, the first and second estimating means estimate "at least a receiving channel parameter".

If the first estimating means is, connected to $r_a(n)$, 302, 304 and 306, then the output from this first estimating means should be "at least a receiving channel parameter". However, according to Bottomley at col. 4, lines 48-53, the output from this "means" is formed by the weight processor 204, which, at col. 3, lines 8-9, is described as determining "the combined weights, as described in equation (2)." Appellant submits that it should be apparent that the "combined weights" are not "at least a receiving channel parameter". Instead, the two multi-tap channel estimators 302, shown in Fig. 3 of Bottomley, correspond to the first and second estimating means of the subject invention in that they do form "at least a receiving channel parameter". However, the two multi-tap channel estimators form their respective channel estimates independently.

The clear teachings of Bottomley is that each multi-tap channel estimator 302 provides a channel tap estimate at each of its output. In the subject specification on page 3, line 27 to page 4, line 18, examples are given for the nature of the estimated channel parameters. None of these examples correspond to the combined weights to be applied to respective half complex multipliers (HCM) 208.

Appellant submits that the clear teachings of Bottomley cannot be ignored by the Examiner in an effort to try to "find" Appellant's invention.

2. Claim 2

The above arguments regarding Bottomley are incorporated herein.

Claim 2 includes the limitation "wherein the channel parameter estimate in the one branch is used as a starting point for the channel parameter estimate in the further branch."

In trying to justify that Bottomley discloses this limitation, the Examiner states "He also discloses the channel parameter estimate in the one branch is used as a starting point for the channel parameter estimate in the further branch (302 from estimating means of $r_a(n)$ branch is connected to 306 from channel estimating means of $r_b(n)$ in Fig. 3; furthermore, 302 from estimating means of $r_b(n)$ branch is connected to 306 from channel estimating means of $r_a(n)$ in Fig. 3)."

Appellant submits that this does not make any sense. Where is the "starting point for the channel parameter estimate in the further branch"? It appears that the Examiner is defining the estimating means of both branches as the impairment correlation processor 306 and the weight processor 204, which in combination produce the combined weights applied to the HCM's 208. However, this cannot be the "estimating means for estimating at least a receiving channel parameter". In order for the channel parameter estimate to be "the starting point for the channel parameter estimate in the further branch", this channel parameter estimate must at least be applied to the multi-tap channel estimator in the other branch. However, as clearly shown in Bottomley, this is not so. Bottomley only discloses that channel estimates are produced by

the multi-tap channel estimators. However, there is no disclosure or suggestion of either of these multi-tap channel estimators using the channel estimate of the other multi-tap channel estimator as a starting point in order to produce the channel parameter estimate.

3. Claim 3

The above arguments regarding Bottomley are incorporated herein.

Claim 3 includes the limitation "wherein the channel parameter estimate in the one branch provides a coarse channel parameter estimate, and wherein said coarse channel parameter estimate is used as a start for the channel parameter estimate in the further branch."

In trying to justify that Bottomley discloses this limitation, the Examiner states "He also discloses the channel parameter estimate in the one branch provides a coarse channel parameter estimate (output of 302 from estimation means of ra(n) branch), and wherein said coarse channel parameter estimate is used as a start for the channel parameter estimate in the further branch (output of 302 from estimation means of ra(n) branch is input to estimation means of rb(n) through 204 and 306 in Fig. 3)."

The Examiner is now calling the tap estimates at the outputs of each multi-tap channel estimator a "coarse channel parameter estimate". This would mean that the "means" 306 and 204 forms a channel parameter estimate at its output.

Appellant first would like to point out that nowhere in Bottomley is there any mention of "coarse channel parameter estimate". Further, the outputs from the "means" 306 and 204 are "combined weights" as clearly set forth by Bottomley, not channel parameter estimates.

Based on the above arguments, Appellant believes that the subject invention is not rendered obvious by the prior art and is patentable thereover. Therefore, Appellant respectfully requests that this Board reverse the decision of the Examiner and allow this application to pass on to issue.

Respectfully submitted,

by /Edward W. Goodman/
Edward W. Goodman, Reg. 28,613
Attorney

(viii) Claims Appendix

1. (Previously Presented) A diversity receiver comprising multiple antenna receiving branches, each of said multiple antenna receiving branches comprising estimating means for estimating at least a receiving channel parameter, wherein a first estimating means in one branch of the multiple antenna receiving branches is operatively connected to a second estimating means in a further branch of the multiple antenna receiving branches for using at least a part of the channel parameter estimate in the one branch as an aid for estimating at least a receiving channel parameter in the further branch.

2. (Previously Presented) The diversity receiver as claimed in claim 1, wherein the channel parameter estimate in the one branch is used as a starting point for the channel parameter estimate in the further branch.

3. (Previously Presented) The diversity receiver as claimed in claim 1, wherein the channel parameter estimate in the one branch provides a coarse channel parameter estimate, and wherein said coarse channel parameter estimate is used as a start for the channel parameter estimate in the further branch.

4. (Previously Presented) The diversity receiver as claimed in claim 1, wherein the second estimating means in the further branch

is operatively connected to the first estimating means in said one branch for using at least a part of the channel parameter estimate in the further branch as an aid for estimating the receiving parameter channel in said one branch.

5. (Previously Presented) The diversity receiver as claimed in claim 1, wherein the diversity receiver has two antenna receiving branches.

6. (Previously Presented) The diversity receiver as claimed in claim 1, wherein the diversity receiver is arranged for estimating a time delay between the appearance of a certain channel parameter estimate in the various branches.

7. (Previously Presented) A mobile radio communication device provided with the diversity receiver as claimed in claim 1.

8. (Previously Presented) A method for receiving a signal comprising the acts of:

receiving the signal through multiple antenna receiving branches;

in each branch, estimating, using estimating means, parameters about a received channel to form channel estimation results;

exchanging the channel estimation results between a first branch of the multiple antenna receiving branches and a second branch of the multiple antenna receiving branches; and

using first channel estimation results about a first received channel from the first branch in the estimating means in the second branch as an aid for estimating parameters about a second received channel in the second branch and forming second channel estimation results.

9. (Cancelled).

10. (Previously Presented) The method of claim 8, wherein said method further comprises the acts of:

estimating a delay value between a first channel parameter in the first branch and the first channel parameter in the second branch; and

synchronizing estimation in the branches by using the delay value.

(ix) Evidence Appendix

There is no evidence which had been submitted under 37 C.F.R. 1.130, 1.131 or 1.132, or any other evidence entered by the Examiner and relied upon by Appellant in this Appeal.

(x) Related Proceedings Appendix

Since there were no proceedings identified in section (ii) herein, there are no decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 C.F.R. 41.37.